

IN THE CLAIMS:

1. (Currently amended) An electronically tuned circuit, comprising a power amplifier coupled to an electronically tunable output network, said power amplifier capable of being operated in a large-signal mode, said output network including an electronically tunable reactive component, ~~a device, and a control line, and a control input, said control input available for connection from external to said output network, further wherein said control input is connected to a time varying tuning input signal, said control line extending between said device and said electronically tunable reactive component, wherein electronic tuning of said electronically tunable reactive component includes non-motor operated electronic tuning when said power amplifier is operated in said large-signal mode, wherein said device configured to provide for~~ varying a control signal on said control line over more than two values control line extends to said electronically tunable reactive component for providing a control signal derived from said time varying tuning input signal, wherein said control signal varies over more than two values for electronically varying reactance of said electronically tunable reactive component over more than two values.

2. (Currently amended) An electronically tuned circuit as in claim 1, wherein said varying reactance of said electronically tunable reactive component tunes said output network is adapted to be tuned to a selected frequency.

3. (Currently amended) An electronically tuned circuit as in claim 1, wherein said varying reactance of said electronically tunable reactive component tunes said output network is adapted to be adjusted to maintain a match between said output network and with a varying load impedance.

- 1 4. (Currently amended) An electronically tuned circuit as in claim 1, wherein said output
2 network is adapted to modulate the signal at said network output varying reactance of
3 said electronically tunable reactive component adds modulation to a large signal in
4 said output network.
- 1 5. (Currently amended) An electronically tuned circuit as in claim 4, wherein said
2 output network is further adapted to provide varying reactance of said reactive
3 component provides a power-amplifier load-impedance locus that substantially
4 maximizes power-amplifier efficiency.
- 1 6. (Currently amended) An electronically tuned circuit as in claim 4, wherein said
2 output network is further adapted to follow a substantially resistive power-amplifier
3 impedance locus; varying reactance of said reactive component causes said
4 power-amplifier load impedance to follow a substantially resistive locus, thereby
5 maintaining power-amplifier efficiency near maximum.
- 1 7. (Currently amended) An electronically tuned circuit as in claim 1, wherein said output
2 network is adapted to be tuned varying reactance of said reactive component tunes
3 said output network in accordance with a predetermined set of tuning inputs.
- 1 8. (Previously presented) An electronically tuned circuit as in claim 7, wherein said
2 tuning inputs are selected in accordance with a lookup table.
- 1 9. (Currently amended) An electronically tuned circuit as in claim 1, wherein said
2 output network is adapted to be tuned varying reactance of said reactive component
3 tunes said output network in accordance with a predetermined lookup table of tuning
4 inputs.

- 1 10. (withdrawn) An electronically tuned circuit as in claim 1, wherein said output
2 network is adapted to be tuned varying reactance of said reactive component tunes
3 said output network in accordance with a sample of the amplifier output.
- 1 11. (Withdrawn) An electronically tuned circuit as in claim 1, wherein said output
2 network is adapted to be tuned varying reactance of said reactive component tunes
3 said output network in accordance with a sample of the network output.
- 1 12. (Withdrawn) An electronically tuned circuit as in claim 1, wherein said output
2 network is adapted to be tuned varying reactance of said reactive component tunes
3 said output network in accordance with a sample of a radiated signal.
- 1 13. (Previously presented) An electronically tuned circuit as in claim 1, wherein said
2 electronically tunable reactive component includes an electronically tunable
3 capacitor.
- 1 14. (Previously presented) An electronically tuned circuit as in claim 13, wherein said
2 electronically tunable capacitor includes a transistor.
- 1 15. (Previously presented) An electronically tuned circuit as in claim 13, wherein said
2 electronically tunable capacitor includes a diode.
- 1 16. (Previously presented) An electronically tuned circuit as in claim 13, wherein said
2 electronically tunable capacitor includes a diode having a control terminal.
- 1 17. (Previously presented) An electronically tuned circuit as in claim 13, wherein said
2 electronically tunable capacitor includes a micro electro-mechanical system device

- 1 18. (Previously presented) An electronically tuned circuit as in claim 13, wherein said
2 electronically tunable capacitor includes a variable-dielectric material.
- 1 19. (Previously presented) An electronically tuned circuit as in claim 13, wherein said
2 electronically tunable capacitor includes a piezo-electric device.
- 1 20. (Withdrawn) An electronically tuned circuit radio-frequency power amplifier as in
2 claim 1, wherein said at least two electronically tunable reactive components include
3 component includes at least one inductive component adapted to be electronically
4 tuned in inductance.
- 1 21. (Withdrawn) An electronically tuned circuit as in claim 20, wherein said at least one
2 inductive component includes a variable- permeability core.
- 1 22. (Withdrawn) An electronically tuned circuit as in claim 20, wherein said at least one
2 inductive component includes a piezo-electric device.
- 1 23. (Withdrawn) An electronically tuned circuit as in claim 1, wherein said at least two
2 electronically tunable reactive components include component includes at least one
3 transmission line adapted to be electronically tuned in electrical characteristics.
- 1 24. (Withdrawn) An electronically tuned circuit as in claim 23, wherein said at least one
2 transmission-line component includes an electrically variable dielectric material.
- 1 25. (Withdrawn) An electronically tuned circuit as in claim 23, wherein said at least one
2 transmission-line component includes an electrically variable magnetic material.

1 26. (Withdrawn) An electronically tuned circuit as in claim 1, further comprising a
2 passive filter coupled to said output network for removing undesired harmonic
3 frequencies.

1 27. (Withdrawn) An electronically tuned circuit as in claim 1, wherein said power
2 amplifier includes an amplifier input, further comprising a second electronically
3 tunable reactive component ~~tuned filter~~ coupled to the said amplifier input of said
4 amplifier for tuning the said amplifier input.

1 28. (Previously presented) An electronically tuned circuit as in claim 1, further
2 comprising a controller, said controller for providing a signal for controlling said
3 electronically tunable output network.

1 29. (Currently amended) An electronically tuned circuit as in claim 28, wherein said
2 controller includes a controller input, further comprising an envelope detector with
3 an envelope-detector input and envelope-detector output, said envelope-detector
4 output coupled to the said controller input of ~~said controller~~, said envelope detector
5 being responsive to an input RF signal and providing a modulation input to said
6 controller.

1 30. (Previously presented) An electronically tuned circuit as in claim 28, further
2 comprising a drive-level adjustor coupled for adjusting amplitude of a signal
3 provided to said power amplifier.

1 31. (Currently amended) An electronically tuned circuit as in claim 1, further
2 comprising a digital signal processor coupled to said power amplifier amplifier and to
3 said electronically tunable output network, said processor for providing a drive signal
4 to said power amplifier and said a time varying tuning input signal to said
5 electronically tunable output network.

- 1 32. (Previously presented) An electronically tuned circuit as in claim 31, further
2 comprising a controller coupled to said digital signal processor and to said
3 electronically tunable output network, wherein output of said digital signal processor
4 is directed to said controller and wherein output of said controller is directed to said
5 electronically tunable output network.
- 1 33. (Previously presented) An electronically tuned circuit as in claim 1, further
2 comprising a drive-level adjustor coupled for adjusting amplitude of a signal
3 provided to said power amplifier.
- 1 34. (Currently amended) An electronically tuned circuit as in claim 33, wherein said
2 electronically tunable output network varying reactance of said reactive component
3 and said drive-level adjuster add modulation to a large signal in said output network
4 are adapted to produce a modulated signal.
- 1 35. (Previously presented) An electronically tuned circuit as in claim 34, wherein said
2 circuit is for providing a desired circuit output, wherein when said desired circuit
3 output has an amplitude that is above a threshold said electronically tunable output
4 network is used to control amplitude and when said desired circuit output is below a
5 threshold said drive level adjuster is used to control amplitude.
- 1 36. (Currently amended) An electronically tuned circuit as in claim 33, further
2 comprising a controller for converting a modulation input said time varying tuning
3 input signal into tuning signals for control of said electronically tuned network
4 tunable reactive component.
- 1 37. (Previously presented) An electronically tuned circuit as in claim 1, further
2 comprising a bias input for setting controlling bias level of said power amplifier.

- 1 38. (Currently amended) An electronically tuned circuit as in claim 37, wherein said
2 bias level is adapted controlled to equal the minimum level necessary to enable
3 operation of the said power amplifier, thereby reducing power consumption.
- 1 39. (Previously presented) An electronically tuned circuit as in claim 37, further
2 comprising a controller for adjusting said bias level in response to at least one from
3 the group including frequency, impedance, and modulation inputs.

1 40. (Currently amended) An electronically tuned circuit comprising:

2 (a) means for power amplifying, wherein said means for power amplifying
3 comprises a large-signal mode; and

4 (b) means for electronic tuning of said means for power amplifying wherein
5 said means for power amplifying is operating in said large signal
6 mode, wherein said means for electronic tuning is coupled to said
7 means for power amplifying, wherein said means for electronic tuning
8 comprises an electronically tunable reactive component, ~~a device, and~~
9 ~~a control line, and a control input, said control input available for~~
10 ~~connection from external to said means for electronic tuning, further~~
11 ~~wherein said control input is connected to a time varying tuning input~~
12 ~~signal, said control line extending between said device and said~~
13 ~~electronically tunable reactive component; wherein said electronically~~
14 ~~tunable reactive component includes non-motor operated electronic~~
15 ~~tuning, wherein said device is configured to provide for varying a~~
16 ~~control signal on said control line over more than two values~~ control
17 line extends to said electronically tunable reactive component for
18 providing a control signal derived from said time varying tuning input
19 signal, wherein said control signal varies over more than two values
20 for electronically varying reactance of said electronically tunable
21 reactive component over more than two values.

1 41. (Previously presented) An electronically tuned circuit as in claim 40, wherein said
2 means for power amplifying operates in class E and said electronic-tuning means is
3 capable of being tuned to provide a reactance for optimum class-E operation for a
4 selected frequency.

1 42. (Previously presented) An electronically tuned circuit as in claim 40, wherein said
2 means for power amplifying operates in class E and said electronic-tuning means is
3 capable of being tuned to provide a reactance for optimum class-E operation while
4 delivering power to a selected load impedance.

1 43. (Previously presented) An electronically tuned circuit as in claim 40, wherein said
2 means for power amplifying operates in class E and said electronic-tuning means is
3 capable of being tuned to provide a reactance for optimum class-E operation while
4 simultaneously modulating the output of said electronic-tuning means.

1 44. (Currently amended) An electronically tuned circuit as in claim 40, wherein said
2 means for power amplifying operates in class E and further comprising a fixed
3 reactance for optimum class-E operation at a first frequency, wherein said
4 ~~electronic-tuning means~~ for electronic tuning is capable of being tuned to provide
5 said power amplifying means with a load impedance for optimum class-E operation
6 for a selected second frequency.

1 45. (Currently amended) An electronically tuned circuit as in claim 40, wherein said
2 means for power amplifying operates in class E and further comprising a fixed
3 reactance for optimum class-E operation with a first load impedance, wherein said
4 ~~electronic-tuning means~~ for electronic tuning is capable of being tuned to provide
5 said power amplifying means with a load impedance for optimum class-E operation
6 with a second load impedance different from said first circuit load impedance.

- 1 46. (Currently amended) An electronically tuned circuit as in claim 40, wherein said
2 means for electronic tuning is connected to an output terminal, wherein said means
3 for power amplifying operates in class E and said ~~electronic tuning~~ means for
4 electronic tuning is capable of being tuned to provide an impedance for optimum
5 class-E operation when the circuit said output terminal is delivering a maximum
6 output signal amplitude, and said ~~electronic tuning~~ means for electronic tuning is
7 capable of being tuned to provide suboptimum class E operation when the circuit
8 said output terminal is delivering less than a maximum output signal amplitude.
- 1 47. (Withdrawn) An electronically tuned circuit as in claim 1, comprising a plurality of
2 amplifier subsystems, wherein each of said amplifier subsystems includes one said
3 power amplifier coupled to an electronically tunable output network, wherein said
4 amplifier subsystems are coupled to a power combiner for delivery of signals from
5 said amplifier subsystems to a common load, wherein each said amplifier subsystem
6 comprises a power amplifier coupled to an electronically tunable output network,
7 said power amplifier capable of being operated in a large-signal mode, said output
8 network including an electronically tunable reactive component, a device, and a
9 control line, said control line extending between said device and said electronically
10 tunable reactive component, wherein electronic tuning of said electronically tunable
11 reactive component includes non-motor operated electronic tuning when said power
12 amplifier is operated in said large-signal mode, wherein said device is configured to
13 provide for varying a control signal on said control line over more than two values
14 for electronically varying reactance of said reactive component over more than two
15 values.
- 1 48. (withdrawn) An electronically tuned power amplifier system as in claim 47, wherein
2 each said varying reactance of each said electronically tunable reactive component
3 tunes said output networks are adapted to be tuned network to a selected frequency
4 frequency.

- 1 49. (Withdrawn) An electronically tuned power amplifier system as in claim 47, where in
2 each said varying reactance of said electronically tunable reactive component tunes
3 said output networks are adapted to be tuned network to match a desired load
4 impedances impedance.
- 1 50. (Withdrawn) An electronically tuned power amplifier system as in claim 47, where in
2 each said output networks are adapted to modulate the signals from said power
3 amplifiers varying reactance of each said electronically tunable reactive component
4 adds modulation to a large signal in each said output network.
- 1 51. (Withdrawn) An electronically tuned power amplifier system as in claim 47, where in
2 said output networks are adapted to cancel reactances resulting from combining said
3 signals.
- 1 52. (Withdrawn) An electronically tuned power amplifier system as in claim 47, further
2 comprising a controller for generating drive and control signals for each subsystem.
- 1 53. (Withdrawn) An electronically tuned power amplifier system as in claim 52, where in
2 said controller is adapted to generating drive signals of different phases for
3 production of an amplitude-modulated system output.
- 1 54. (Withdrawn) An electronically tuned power amplifier system as in claim 52, where in
2 said output networks are adapted to cancel time varying reactances resulting from
3 combining out-of-phase signals.
- 1 55. (Withdrawn) An electronically tuned power amplifier as in claim 47, further
2 comprising a passive filter coupled to said power combiner for removing undesirable
harmonic frequencies and distortion products.

1 56. (Currently amended) An electronically tuned circuit, comprising one or more power
2 amplifiers, wherein said power amplifiers are capable of operating in a large-signal
3 mode, further wherein said one or more power amplifiers has an output network, said
4 output network including a tuning input, a network output, and an electronically
5 tunable reactive component, a device, and a control line, said control line extending
6 between said device and said electronically tunable reactive component, wherein said
7 tuning input is available for connection from external to said output network, further
8 wherein said tuning input is connected to a time varying tuning input signal, wherein
9 electronic tuning of said electronically tunable reactive component includes non-
10 motor operated electronic tuning when said one or more power amplifiers are
11 operating in said large-signal mode, wherein said device configured to provide for
12 varying a control signal on said control line over more than two values control line
13 extends to said electronically tunable reactive component for providing a control
14 signal derived from said time varying tuning input signal, wherein said control signal
15 varies over more than two values for electronically varying reactance of said
16 electronically tunable reactive component over more than two values.

1 57. (Currently amended) An electronically tuned circuit as in claim 56, wherein said
2 varying reactance of said electronically tunable reactive component tunes said output
3 network is adapted to be tuned to a fixed or variable frequency.

1 58. (Currently amended) An electronically tuned circuit as in claim 56, wherein said
2 varying reactance of said electronically tunable reactive component tunes said output
3 network is adapted to be adjusted to maintain a match with a varying load impedance
4 at said network output.

- 1 59. (Currently amended) An electronically tuned circuit as in claim 56, wherein said
2 varying reactance of said electronically tunable reactive component adds modulation
3 to a large signal in said output network is adapted to modulate the signal at said
4 network output.
- 1 60. (Currently amended) An electronically tuned circuit as in claim 1, wherein said
2 output network includes at least two reactive components connected as a tuned
3 circuit, wherein said electronically tunable reactive component includes at least one
4 of said reactive components is adapted to being electronically tuned by a tuning
5 signal.
- 1 61. (Previously presented) An electronically tuned circuit as in claim 28, wherein said
2 controller converts an input signal to a voltage suitable for controlling said tunable
3 output.
- 1 62. (Previously presented) An electronically tuned circuit as in claim 1, wherein said
2 electronically tunable reactive component is continuously variable.
- 1 63. (Previously presented) An electronically tuned circuit as in claim 40, wherein said
2 electronically tunable reactive component is continuously variable.
- 1 64. (Previously presented) An electronically tuned circuit as in claim 56, wherein said
2 electronically tunable reactive component is continuously variable.

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